IN THE SPECIFICATION

Please amend paragraphs [0069], [0072], [0075] – [0077], and [0087] as follows:

[0069] Referring to FIG. 2, a detection element 1 is provided with detection electrodes 11 and 12 to electrically contact an object 10. A supply signal generating unit 2 is provided with a frequency generating circuit 21 and waveform shaping circuit 22. A response signal generating unit 3 is provided with a current-voltage conversion circuit 31. A waveform information detection unit 4A is provided with a ~~reference signal generating circuit 41~~reference signal generating circuit 42 and phase comparison circuit 42. A biometric recognition unit 5A is provided a signal conversion circuit 51 and a determination circuit 52.

[0072] The ~~reference signal generating circuit 41~~reference signal generating circuit 42 of the waveform information detection unit 4A outputs a reference signal ~~41S~~42S synchronized with the supply signal 2S to a phase comparison circuit 42. The phase comparison circuit 42 compares the response signal 3S with the reference signal ~~41S~~42S to detect an impedance characteristic unique to the object 10, a phase difference corresponding to a capacitive component in this case, and outputs it as a detection signal 4AS. In this case, the supply signal 2S may be used as the reference signal ~~41S~~42S.

[0075] In this embodiment, the phase comparison circuit 42 of the waveform information detection unit 4A compares the phase of the reference signal ~~41S~~42S output from the ~~reference signal generating circuit 41~~reference signal generating circuit 42 with that of

the response signal 3S, and outputs a detection signal 4AS containing the phase information (phase difference) of the response signal 3S.

[0076] FIGS. 3A to 3D show signal waveform examples at the respective components in FIG. 2. When a sine wave centered on a common potential such as ground potential is used as the supply signal 2S, the phase of the response signal 3S changes in accordance with the impedance of the object 10. By using a signal synchronized with the supply signal 2S as the reference signal ~~41S~~42S and making the phase comparison circuit 42 compare the phase of the reference signal ~~41S~~42S with that of the response signal 3S, for example, the detection signal 4AS having a phase difference .phi. as a pulse width is output.

[0077] Since the phase comparison circuit 42 is provided for the waveform information detection unit 4A to compare the phase of the response signal 3S with that of the reference signal ~~41S~~42S in this manner, a phase which changes in accordance with the intrinsic capacitive component of the object 10 can be detected as waveform information representing the waveform of the response signal 3S. This makes it possible to minutely detect an electrical characteristic of an object, information representing the imaginary component of the intrinsic impedance of the object 10 in this case, by using a phase comparison circuit such as a general comparator or logic circuit, which is a very simple circuit arrangement as compared with the prior art, without requiring a resistive element or capacitive element which requires a large area. This in turn can easily realize a reduction in the size of the biometric recognition apparatus and the formation of a chip.

[0087] The waveform information detection unit 4A is equivalent to the waveform information detection unit 4A in FIG. 2 described above, and is designed such that a phase comparison circuit 42 compares a reference signal ~~41S~~42S output from a ~~reference signal generating circuit 41~~reference signal generating circuit 42 with the response signal 3S to output a detection signal 4AS containing phase information of the response signal 3S. The waveform information detection unit 4B is equivalent to the waveform information detection unit 4B in FIG. 4 described above, and is designed such that a peak voltage detection circuit 43 detects the amplitude peak value of the response signal 3S to output a detection signal 4BS containing the peak value.